Female loan clients - a safer bet?

A study of default rates in a microfinance institution.

Tone Sindre Hoff

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Department of Economics

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http://www.duo.uio.no/

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Any remaining errors and inaccuracies in this thesis are my own responsibility.

Summary

This thesis takes a closer look at what affects the default rate in Banco D-MIRO, one of the largest microfinance institutions (MFIs) in Ecuador. This MFI provides over 35,000 local borrowers with financial services. Banco D-MIRO's targeted markets are marginalized families and micro-entrepreneurs, groups which have been excluded from the traditional financial system for different reasons, such as culture, sex, race, poverty, disability, and illness.

The dominant microfinance discourse suggests that women's default rate is lower than the default rate for men, and also that they use the loans for better purposes. My research question is:

Are female loan clients in D-MIRO less delayed on their loans than men?

In addition to this I want to investigate if there are different factors affecting the default rate of men and women.

First I will look at literature discussing these topics to find out what factors are typically used to explain differences in default rate. Then I will use regression analysis to analyze a dataset that contains information about loan clients from D-MIRO. The dataset contains information about both male and female borrowers. I chose to focus my analyses on the variables age, educational level and marital status to investigate whether these factors correlate with repayment. It seems to be no statistically significant difference between men and women on the repayment rate. However, investigating the differential impact of these other variables I find some differences between men and women.

Contents

1 Introduction

"Give a man a fish, he'll eat for a day. Give a woman microcredit, she, her husband, her children and her extended family will eat for a lifetime." – Bono

In 2006 Muhammad Yunus and Grameen Bank received the Nobel Peace Prize, and it seemed as if the popularity of the microfinance movement would never end. There are many good reasons why microfinance gained such enormous support in the first place. Did we finally have a cure against poverty? Media, donors, rock stars, policy-makers and the public in general, embraced this idea of poor people lifting themselves out of poverty. Not through humble begging, but with their own willpower and determination, using entrepreneurial creativity to create businesses. Decades with aid to poor countries had in many cases not seemed to lead to a noteworthy improvement of growth and better distribution of wealth. The typical history of foreign aid too often includes stories of corruption, reports of money not reaching the ones who need it the most, and failure of understanding local culture and way of living.

After a few years, most of the enthusiasm for microfinance had faded away. Stories of poor people tricked into debt-traps became well known, and soon the number of critics seemed to exceed its supporters.

The aim of this thesis is not to discuss to what degree microfinance contributes to poverty-reduction. Not every poor person is born to be an entrepreneur. However, as Banerjee et al. (2011) among others point out, microfinance is just *one* of the instruments in the fight against poverty.

Lending out money to poor people without security is risky business. One of the keys to keep microfinance sustainable and self-driven is to keep the default rates as low as possible.

The focus on women is one of the main characteristics of MFIs. Even though many claim that female loan clients are more reliable, there is little empirical evidence of this actually being true.

Taking a closer look at research done in this area, and analyzing the data available, I will hopefully be able to say something about what affects the default rate in D-MIRO, thus making it possible for this MFI to organize their credit-services in a better way.

This thesis is organized the following way:

In section 2, I briefly describe the background and goals of the microfinance movement. Then in chapter 3 I describe similar studies and their findings. In section 4 the results of the regression analysis are shown. This section also contains a discussion of the results, and I compare those to results from other studies. Section 5 concludes.

2 Microfinance

2.1.1 Defining microfinance

Microfinance is not always defined in the clearest way. Armendáriz (2011) describes microfinance for loans (i.e. microcredit) to be the supply of small-scale financial services to people who are without access to traditional banking services. Through its promotion of this small-scale lending Grameen Bank has become known worldwide for its work within this field, and is often given much credit for the invention of this type of loans. (Smillie 2009)

2.1.2 More than credit

Nevertheless, microfinance is about more than just credit. Today several programs offer saving products. In addition different types of insurances are getting more and more popular in the group of products that financial institutions offer poor people. Karland and Goldberg (2011) emphasize that today there are no longer only special institutions for the poor that offer microfinance services, since more and more commercial banks and insurance companies have started to downscale in order to reach new groups of clients. Consumer durables companies are also aiming at poor people with microcredit arrangements, and even Wal-Mart offers transferring services. From this it seems likely that not all programs labeled as "microfinance" corresponds well with what most people associates with it.

The Consultative Group to Assist the Poor, CGAP (2013), uses the following definition on their web page:

"The term "microfinance," once associated almost exclusively with small-value loans to the poor, is now increasingly used to refer to a broad array of products (including payments, savings, and insurance) tailored to meet the particular needs of low-income individuals."

The problem with labeling programs that differ a lot from each other as microfinance programs is the underlying message that the programs can be

benchmarked against other microfinance programs. If the services of the different programs offered are very different from each other, it may be hard to conclude why one program is more successful than another.

As Hval (2009) remarks, microfinance can therefore be described as a more general description of financial services targeting the poor, while microcredit focuses only on the aspect of lending.

2.2 Background

The tale typically starts with Muhammad Yunus and how his project of lending a small sum to a group of poor women in Bangladesh in the 1970s a few decades later has grown to serve more than 8 million poor families with loans, insurances and other services (Grameen Bank). When Yunus together with Grameen Bank won the Nobel Peace Prize in 2006 for their efforts to create economic and social development from below, the concept suddenly became world famous. However, as Mersland and Strøm (2012) point out, financial services for the poor is something that goes much further back than this.

According to Moyo (2009) the reason for the success of Yunus and Grameen Bank was their realization of the community of interdependence and trust that was present in many poor villages, which seemed to lack other obvious visible assets. Converting this interdependence into collateral, in her opinion, was what made Grameen Bank possible.

Smillie (2009) describes the enormous support experienced by the microfinance movement during the 1990s. A Microcredit Summit was held in Washington in 1997, and here a campaign to reach 100 million of the world's poorest families was introduced. The Microcredit Summit especially emphasized the aim of targeting the women of those families, with credit for self-employment and other financial and business services by the year 2005.

2005 was by the UN declared the “Year of Microcredit”. At the end of 2006 the Microcredit Summit Campaign reported that its targets of 100 million borrowers had been exceeded by 33 millions. Another target of 175 million was set for 2015. (Microcredit Summit Campaign)

The high lending rates are often described as a common feature of microcredit, and have been criticized by many. How can people borrow themselves out of poverty, paying interest rates which often are much higher than many consumer credit lending banks in richer countries?

The public’s view on the microfinance industry changed drastically only few years after Yunus won the Nobel Prize. As Strøm and Mersland (2012,490) express it; *“the journey from a hero to a crook took 4 years.”*

This turn was mainly caused by events that took place in 2010 and 2011, when news arrived of tragic suicides in the Indian state of Andhra Pradesh. It seemed that these suicides were a result of strict methods of collecting MF-loans. News articles with headlines such as “*India's micro-finance suicide epidemic*” (BBC) made it clear that microfinance had not lived up to its expectations.

The documentary “Caught in Micro Debt” shown by The Norwegian Broadcasting Corporation (*NRK*) in November 2010 took a critical look at the microfinance industry, its benefits to the developing countries, and also claimed that Yunus had spent money from Norway given as aid on projects not involved with microcredit operations. Even though Norwegian authorities discharged him of these accusations, as Mersland and Strøm (2012) point out, this documentary had serious consequences for Yunus. His opponents used this case to have him removed as leader of the Grameen Bank.

Another result of this documentary was soon clear; a serious questioning of practices in the microfinance industry. From being praised by the public as a solution to world poverty, it was now being met by serious criticism. Appel and Karland (2011) describe microfinance as a perfect example of something

that created enormous enthusiasm and support before there existed evidence of its effects, a characterization that seem to be spot on.

2.2.1 Entrepreneurs at every corner?

Banerjee et al. (2011) outline the basic premise of Yunus's world view, which they believe to be shared by a majority in the microfinance movement; that everybody has a possibility of being a successful entrepreneur. They point to two distinct explanations for why poor people should be especially likely to find such incredible opportunities: that they have not been given a chance before, so their ideas are new, and less likely to have been tried before, and also the fact that the market so far has ignored the group at the bottom of the pyramid. But as they remark, there are reasons for concern. While there are many poor people operating businesses, to a large extent the businesses they manage are very small. And for the most part these businesses don't make a lot of money.

Smillie (2009) also questions why so many seem to believe that to start a business is every poor person's way out of poverty. He acknowledges that if lending to poor people can be financially sustainable, it would be of great interest since it would not lead to aid dependency. But, he is not convinced that the poor as a group are especially more fit to be entrepreneurs than others.

Nevertheless, this being noted, microcredit and other types of helping small businesses may still have an enormous important role to play in poor people's lives. As Banerjee et al. (2011) observe, these tiny businesses may be the only way many of the poor manages to survive.

2.2.2 New opportunities to the poor

Poor people's lack of access to conventional financial services has often been described as their reason of staying in poverty. As Sundaresan (2008) comments, it is hard to imagine how Brazil, China and India could develop before their large number of poor inhabitants easily could gain access to essential financial services, which he believes to be crucial to get out of poverty. He also points to the fact that in many developing economies a significant part of the population is not able to gain access to organized financial institutions and markets, due to being extremely poor, not well educated and without possibilities of secure income.

However, offering banking opportunities to people who have been excluded from these types of services is not without challenges. Perhaps the main reason why poor peoples lack access to markets is the fact that lenders and service providers in the formal markets have very little information about the potential customers of their services.

2.2.3 Information asymmetries

Moral hazard and adverse selection problems arise as a consequence of asymmetric information between the lending institution and the borrower. The World Bank (2008) describes risk management and high transaction costs of processing, monitoring and administering small loans, to be the main challenges of delivering credit. De Aghion and Morduch (2004), among others, elaborate on the information asymmetries that are linked to these risks. It could be due to adverse selection, where the lender is unable to distinguish between borrowers with high or low risk. Another explanation is that it could come from moral hazard, which is the tendency of borrowers of spending their loan on projects which are not profitable, such that they are less likely to repay their loan, and the inability of the lender to discover and discourage such behavior. The bank can foresee this, and as De Aghion and

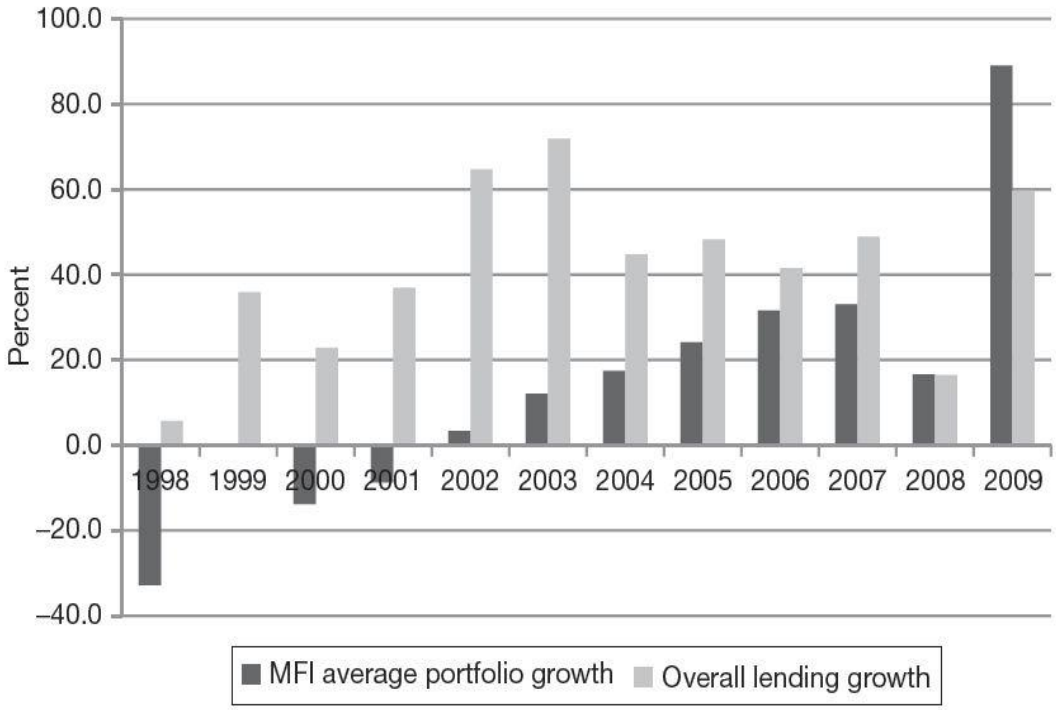
Morduch (ibid) point out, this would lead to an increase in interest rates to be able to compensate for the additional risk.

The important role of peer monitoring is emphasized by Stiglitz (1990). He explains how this can create incentives to monitor each other, and where it is likely that borrowers would like to report if one of the other borrowers uses a risky technique.

Karlan and Zinman's (2009) study of a South African consumer lender show how dynamic incentives, such as guarantee of repeated lending, have been another way to work against moral hazard when working with risky customers. Similarly, other studies show that giving loan clients the expectation of repeated loans will lead to a reduction of risky investments, and also to an improvement in repayment behavior. (World Bank 2008)

2.2.4 A growing field

Figure 1: Shows growth in total loans and the MFI's average growth in loan portfolios to MFI's who report to http://mixmarket.org from 1998- 2009.



In the last years there has been an enormous growth on the market for microfinance. Figure 1, taken from Mersland and Strøm (2012) describes growth in total loans (black) and the average increase in loan portfolios to MFI's who report to MIX Market from 1998 to 2009. This organization provides data on more than 2100 MFIs in the developing world covering 94 million borrowers (MIX Market).

We can see how the MFIs average portfolio growth has increased from 1998-2009. For several years growth in this sector has been between 40-60 %, and on average portfolios have grown by 41.5 %. Mersland and Strøm (2012) explain that this could be due to the fact that the number of MFIs has increased in this period. However, they also remark that growth in each MFI has been strong, with an annual average growth rate of over 20 % for several years. These growth rates remained positive even in 2008, when the financial crisis hit most of the global economy. In 2009 the number of MFIs shrank from 1358 to 1139, but at the same time there was an increase in loans, which led to a strong growth in the average growth rate this year.

2.2.5 Key characteristics

Karland and Goldberg (2011) point to the following 9 features of microfinance:

(1) Small transactions and minimum balances (whether loans, savings, or insurance)

(2) Loans for entrepreneurial activity

(3) Collateral-free loans

(4) Group lending

(5) Focus on poor clients

(6) Focus on female clients

(7) Simple application processes

(8) Provision of services in underserved communities

(9) Market-level interest rates

Whether these descriptions are necessary for a program to be labeled as microfinance can be discussed. Different MFIs operate in very different ways regarding their conditions for a loan. Some MFIs visit clients to confirm that their loans are used for the entrepreneurial activities they are supposed to. Others may choose not to ask many questions as long as they get their money back, behaving more like consumer credit lenders.

2.3 Focus on women

A majority of MFIs focus on women. The attention of the microfinance movement has been focused on working for direct access to credit for poor people and especially poor women (World Bank 2008). The overwhelmingly representation of women, as Sundaresan (2008) brings up, has been one of the most characteristic features of microfinance, since it was popularized in the middle of the 1970s in Bangladesh.

As discussed by Appel and Karlan (2011), it has been argued that women are better at repaying their loans. It is also claimed, for instance by Thomas (1990) that a higher share of their earnings passes on to their families, leading to an increase in the households spending on food and education for their children. Some MFIs have spoken of their operations nearly failing until they shifted their lending practices to focus on female clients.

Mayoux (2001) offers these main arguments for targeting women; gender equality, poverty reduction, and that it will lead to MFI efficiency. He argues that group-based microfinance is an advantage especially for women, not only having an impact on poverty reduction, but also on women's empowerment.

A large number of female MF-clients are married or live with a partner, and have children. A common belief among many MFIs has been that focusing on women will have a greater impact in poverty-reduction, than focusing on men. Thomas (1990) studied child health in Brazil, measured by survival probabilities, height-for-age and weight-for-height, together with households intake of nourishing food. He observed that this tended to rise if additional non-labor income was administered by women instead of men. In addition he found that income attributed to the mother instead of the father had a huge impact on child survival probabilities, an effect which was almost 20 times bigger.

It is also shown in studies from Thailand that non-labor income in the hands of women tends to reduce fertility more than non-labor income possessed by men (Sundaresan 2008)

An important empirical study on microfinance and gender which has had a large influence on the increased focus on women is found in a 1998 study by Pitt and Khandker. Using cross-section data from Bangladesh for 1991-1992, they discuss different sorts of biases that could arise, such as if the loan clients who self select themselves into a microfinance program, are the ones who are poorest and also the ones who are most skilled in entrepreneurial activities. They believe it to be unlikely that credit programs are allocated across the villages of Bangladesh in a random way, pointing to the fact that program officials often note that they place programs in poorer and more flood prone areas, as well as in areas in which villagers have requested program services. As pointed out here, the problem with treating the timing and placement of programs as random in these cases, can lead to serious mismeasurement of the effectiveness of the programs. By overestimating the effect these microfinance projects could have on reducing poverty, the results could differ a lot if these programs started admitting poorer clients, with less entrepreneurial skills.

Pitt and Khandker use an instrumental variable (IV) in their study; land-ownership, which correlates with the variable they want to study, but not with the result of the business. To qualify for a microloan, borrowers were not allowed to own more than half an acre of land. In their study they used this IV to compare villages which received the possibility to receive microfinance to control villages without this opportunity. Then they were able to study differences in entrepreneurial abilities between villages where the poor with little/no land received loans versus control villages were poor with little/no land did not have access to microloans since there were not that many microfinance suppliers. They also looked at the role of gender-specific credit.

The intention of this study was to see if the behavior of the credit participant varied with gender. They report that when 100 takas were lent to men, this would lead to 11 takas going into household expenditures (like food/nutrition/working tools), but the same amount lent out to a woman would lead to 18 takas spent on household expenditures.

The main findings of this study are well known, and the results have to a large degree been influential for the tendency to focus donor's aid as subsidized loans for women. Sundaresan (2008) points out that it would be bold to claim that the findings of Pitt and Khandker alone can be held responsible for having influenced the bias towards women in recent microfinance initiatives. He emphasizes however, that in the absence of any countervailing empirical evidence, Pitt and Khandker's findings contributed to the norms and operational practices of CGAP, World Bank, as well as many other multilateral organizations engaged in providing subsidized microfinance. The priority of these institutions has been to direct by subsidies loans to women.

The findings from Bangladesh were later attacked by Roodman and Morduch (2009) who claimed to have been able to prove that the effect discovered by Pitt and Khandker did not exist. This criticism was later responded by Pitt, who pointed out that Roodman and Morduch had committed errors in their statistical work, and that the results from 1998 still could be counted as valid. Mersland and Strøm (2011) describe this academic dispute, and conclude that to in what degree the history of Pitt & Khandker vs. Roodman & Morduch can be used to anything, it is that working with statistics on poor people's economy is very hard. Also Banerjee et al. (2009) comment on these different studies, and sum up that there is so far no consensus among academics on the impact of microcredit.

2.3.1 Women- better credit risk or not?

Even though it is a common belief that repayment rates are higher for women, it is not well documented. Evidence from consumer loans in South Africa (Karland and Zinman 2010) show that women are 3 % less likely to default on their loans, from a mean of 15 % default. The reason for this is debatable. Appel and Karlan (2011) discuss different reasons for this: Some claim that women are simply more responsible, while some argue that women, having fewer borrowing options than men, are careful of jeopardizing their relationship with their MFI by defaulting. They point out that if this is true, we may expect to see the repayment gap diminish over time as financial access expands.

The cost of lending out to women is often higher than lending out to men, because of their average loan size, which often is smaller (Agier and Szafarz 2010). D'Espallier et al (2009), remark that from a financial perspective focusing on women can be both positive and negative. They state that women do repay at a higher rate, which leads to lower risk and increases the profitability. On the other hand, they point out that MFIs that focus on women usually make use of smaller loans, something that leads to an increase in their operational costs. The net result from their study is that MFIs with a special focus on women have, on average, similar overall profitability measures.

Other problems could arise by only making microloans available for women. Sundaresan (2008) discusses how the bias in favor of loans to women in MF has been followed by an increasing trend to exclude men from microfinance services, especially at very low income levels. Sundaresan claims there are two main implications from focusing only on women. On the one hand, higher income for women may lead to increased health and education-benefits for both themselves and members of their household. On the other hand, excluding men from subsidized finance might lead to disagreements, and to men supporting them less, leading to smaller effects on health and education for all household members.

Women were not the center of attention for the first initiatives to supply credit in poor countries through development banks and cooperative movements. This changed rapidly with the development of modern MFIs. Numbers from the Grameen Bank is a good example of this increased interest in women. Here the proportion of female loan clients grew from 44 % in 1983 to 95 % in 2001. (D'Espallier et al. 2009)

D'Espallier et al. (ibid) use a global dataset of 379 MFIs in seventy-three countries to investigate the characteristics of MFIs that have a gender bias and how this bias affects loan clients' financial performance. In their dataset, women represent 73 % of MF customers on average, and 42 % of MFIs declare a conscious gender bias towards women. Their result indicate that MFIs with a conscious gender bias can be associated with group lending methodologies, international orientation, female leadership, smaller loans, and a non commercial legal status. Regarding performance, their findings show that having a conscious gender bias significantly leads to an improvement of repayment, but it does not lead to an increased overall profitability. The positive repayment effect that is associated with a focus on women is set back by higher costs. This is related to smaller loans. The lack of empirical evidence on many of the theoretical arguments concerning female targeting as well as its consequences is a concern of the authors; they emphasis that MFI financial performance is more than just repayment, and therefore the financial efficiency of targeting women is far from obvious. They refer to various reasons for why targeting women is more costly; that they borrow smaller amounts, that they are less mobile and less educated, and that they need additional services (health, education, literacy, child care, etc.) and perhaps additional monitoring. Therefore, they conclude that a focus on women and overall MFI financial performance goes further than repayment rates and should have much attention.

To develop systems that make it possible to observe and evaluate the impact gender has on microfinance programs seem to be of huge importance for the further course of MFIs. And as Armendáriz and Morduch (2007) point out, it

is also important to remember that issues concerning gender are given by region and culture, and what holds in one case, may not be true for other contexts.

3 Review of similar studies

Default-rates differ a lot between different banks. There may be several reasons for this, and even though the most universal feature of MFI is the targeting of poor people, there may be local characteristics that make it hard to draw universal conclusions from findings in one country to another. However, to be able to decide which areas to concentrate on, a review of similar studies is necessary.

3.1 No "perfect" representative

Extensive research has been done to investigate reasons for default-rate in similar institutions. Nevertheless, as D'Espallier et al. (2009) point out, there is no dataset which perfectly illustrates the microfinance field. The evidence varies a lot and is often anecdotal. Factors such as the age of the MFI, different practices regarding financial training before receiving a loan, age of loan clients, and other types of variation may be possible reasons for fluctuations in default-rates, even though many MFIs target similar groups.

As mentioned earlier, the findings of D'Espallier et al. (ibid) suggest that women in general are better at repaying microcredit loans, and thus prove policy makers and practitioners who have claimed this for a long time, to be right. They remark that higher female repayment rate does not necessarily mean higher welfare for women. It could be that it is the consequence of a debt trap, and they also suggest that it could be due to enforcement practices that are more feared by the female loan clients.

However, there is little consensus among academics about how much can be explained by gender when it comes to repayment rates.

Anthony and Horne (2003) use data on microcredit loans from a non profit organization primarily based in New England to analyze the role of gender for microcredit loan-repayment. The result of their analyses shows that for a model where only gender is included, women appear to be less likely than

men to default. But when they include group gender composition to the model, the individual gender is no longer significant. Their results suggest that individuals who belong to groups containing a bigger proportion of women are less likely to default on their loan.

Microcredit is no longer only available for small scale entrepreneurs in the poorest countries. Also in the United States there are development practitioners who have found inspiration from well known MFIs, and offer small scale loans to poor people in America's urban areas. Bhatt and Thang (2002) discuss challenges facing these MFI's, and also they express their concern that most accounts of loan repayment performance are anecdotal, and often paint a confusing picture of the factors that might explain high repayment rates. Bhatt and Thang investigate the determinants for repayment rate for 4 microcredit programs in the US. Their data show that higher levels of education and proximity to the lending agency leads to better repayment performance. In their study the borrower's gender does not seem to affect chances of repayment.

Field and Pande (2008) used data from a field experiment on repayment schedules conducted in urban India to investigate whether the frequency of repayment would have impact on the repayment rate of loans. They found that changing from weekly to monthly installments did not lead to any changes in the repayment ability of the loan clients. This finding could have large implications for the efficiency of MFIs. Weekly collection of repayment has been believed to help reduce default risk in absence of collateral, but as Field and Pande point out, this leads to higher costs for the MFIs. They also remark that the frequency of repayment may be more important for the discipline if loan clients advance to larger loans.

The proportion of lenders with complete primary education has been claimed by Olomola and Niser (2000) to be key in determining the repayment rate of the borrowers. They also point to that the size of the loan, member regularity at meetings, use of loans, borrowing experience and savings mobilized in previous years are crucial.

Roslan and Karim (2009) examine the determinants of loan repayment among borrowers of Agrobank, a commercial bank in Malaysia, which is founded as a development finance institution directly involved in financing the agriculture sector. They report that the probability of default in this bank is influenced by the gender of the borrower, type of business activity, amount of loan, training and the repayment period. Regarding gender, their analysis shows that the probability of default is lower among female borrowers and this study thus seem to support the argument that women represent a lower credit risk. Another factor that affects the repayment rate is which type of business the loan clients borrow to invest in. In this case they find that borrowers involved in the service-industry have a lower probability of default, compared to those who invest in production activities. Their analysis also suggest that the larger the size of the loan, the lower the probability of default. In addition they found that the probability to default is higher for longer repayment periods. They also find that giving loan clients financial training led to improvements of the default rate.

Whether this bank uses the practice of promising repeated lending, meaning that borrowers in the beginning are granted small loans, and that they may increase loan size when they can prove they are able to handle the smaller sums, is not mentioned. If this is the case, it may be likely that we face a problem of endogeneity; that those granted the bigger loans are the ones who have proved to be most credit-worthy, and then it is not possible to tell whether giving out larger loans will lead to higher repayment rates.

Does marital status explain default risk? Agarwal et al. (2010) investigate the effects of marriage on default rate when comparing two groups of borrowers: joint liable borrowers versus independent borrowers.

In their data they find that the default risk is lower among joint liable borrowers, than with borrowers who don't participate in joint-liability programs. They see that many of the joint liable borrowers are married, and that it therefore may be possible that the joint liability designation is simply covering the lower risk associated with marital status. When they estimate

the default model controlling for the effects of marriage, interesting differences in the default risk based on marital status are revealed. They find that married borrowers are 8.3 percent less likely to default than single borrowers. Second, the marginal effect for unmarried joint borrowers indicates that they are 3.8 percent less likely to default than single borrowers. In their study it appears that being married does significantly reduce the odds of default.

4 Empirical results

This thesis investigates whether there are significant differences between men's and women's rate of default in the MFI D-MIRO in Ecuador. A majority of MFI's target female loan-clients, arguing that women invest in less risky business, and spend more of their income on their family, thus having a greater impact on reducing poverty. D-MIRO claims no special commitment to serve women. This makes it possible to look for differences between genders.

4.1 Data

The data is collected by D-MIRO, a MFI in Ecuador, which was founded in 1997 by the Norwegian Mission Alliance. The dataset consists of 44 858 observations.

D-MIRO offers microcredit-loans to both men and women, and is therefore suitable for comparing the two groups. Compared with many other MFIs it has a quite even gender-distribution. This makes our data suitable for exploiting differences between repayment rates between men and women.

Several reasons can be thought of as having an impact on the default-rate. There could be a problem of including too few variables in the analysis, as this could cause an omitted variable bias (Stock 2007). However, having to concentrate the analysis, some of the variables had to be omitted.

4.1.1 Description of the data

The dependent variable is the number of days a repayment is delayed *("delayed_pay").* Microfinance institutions measure this in PAR (Portfolio at Risk), such as PAR30, where the number indicates how many days the loan client is delayed in repaying. The Financial Supervisory Authority of Ecuador operates with rules for these different levels of delay. From day 1 there are costs for the bank, since a certain percentage is charged from the account in

order to cover for future losses. The higher the level of PAR, the higher percentage has to be charged. PAR1 is therefore considered to be a serious deviation, and the bank follows this up carefully. The first 30 days the portfolios of the loan clients are followed up by their own loan consultant. The loan consultant will try to restructure to loan, and make new agreements for repayment. After these 30 days the case is followed up by special units, such as call-centers and the juridical department. If this doesn't help, it will eventually lead to a case for placing debt for collection. This will lead to a registration in public payment records. All delays in repaying debt will lead to costs for the bank, and therefore are cases carefully followed up from day 1. (Andersen, 2012)

Table 1: Description of data

	Total	St. dev	Mean	Min	Max	Percent
Delayed pay	7855	306.13	96.7	0	2303	17.5
Female loan clients	26 636	0.4911	0.5937	0	1	59.4
Male loan clients	18 221	0.4911	0.4062	0	1	40.6
Age	44 857	11.20	41	17	79	100
Age young	424	0.09	19	17	20	1
Age young adult	13 775	0.46	29	21	35	31
Age adult	28 464	0.48	46	36	60	63
Age old	2194	0.21	64	60	79	5
No education	631	0.11	0.01	0	1	1
Low education	19 546	0.49	0.44	0	1	44
Medium education	24 529	0.49	0.547	0	1	54.7
High education	151	0.05	0.003	0	1	0.3
Married	12 989	0.45	0.29	0	1	29
Divorced	1882	0.20	0.42	0	1	4.2
Cohabit	10 707	0.42	0.24	0	1	24
Widower	957	0.14	0.02	0	1	2
Single	18 322	0.49	0.408	0	1	40.8

Table 1 presents summary statistics for key variables in my sample. This dataset contains information of 44 857 loan clients. The percentage of female clients in D-MIRO is shown by "female": approximately 59 %. Even though the majority of the loan clients are women, this number is quite even compared with other banks, and when taken into account that

approximately 82.7 % of the 146.7 million poorest clients reached by microfinance are women (Microcredit Summit Campaign).

The variable “age” shows the age of clients in the whole sample. The age of D-MIROs clients range from 17-79 years, and their average age are around 41 years. Approximately 1 % of the customers are below 20 years old, 31 % are in the group between 21 and 35. Approximately 63 % are in the group between 35 and 60, and 5 % in the group over 60.

Then the loan client’s level of education is presented. Approximately 1 % of the loan clients in this sample have not obtained any sort of formal education. 44 % have finished the lowest level of education. The description “Low education” consists of the educational level “basic” and “primary”. The description “Medium education” contains two variables; those finished with three years of secondary school, and those who have completed 6 years of secondary school. Only 0.3 % of the loan clients in this sample have finished “higher education”, meaning that they have completed minimum 4 years of higher education. Married, divorced, cohabit, widower and single tells us the marital status of clients in our sample. 29 % of the loan clients are married, 4.2 % are divorced, 24 % are cohabiting and 2 % are widowers. There is a large number of single loan clients in this sample; 40.8 %.

4.2 Econometric approach

To find out which variables are correlated with loan clients default-rate in D-MIRO, I use the method of linear regression. Using this method, some classic econometric challenges are encountered. By estimating the effect of one variable on the default rate, I may mistakenly have excluded other variables that could have been relevant to include in the regression. This could come from mistakenly not considering the variable to be relevant for this analysis, or due to difficulties regarding ways of measuring this variable. This could lead to an over- or underestimation of the effect of a regressor. By excluding variables that are correlated with the regressor, and in reality is a determinant of the dependent variable, the results of the analysis would be biased. Whether a bias is large or not depends therefore on the correlation between the independent variables and the error term. A larger correlation leads to a larger bias. (Stock 2007) Nonetheless, the regressions presented in this paper have a descriptive purpose and while we cannot say that the correlations are causal they are still of interest.

In this thesis I use STATA 12 to perform a regression analysis to be able to determine and isolate components which are correlated with the repayment rate, and at what extent these variables influence repayment. The regression model used here has a linear function form.

The studies mentioned in chapter 3 used several different models to investigate what factors affects the repayment rate in MFI's. Having to concentrate the work of this thesis, I chose a set of key variables that I believe are likely to have an impact on the repayment rate. There are of course many factors not included in this analysis, which opens the possibility that there are more things that affect the loan client's ability to repay than what will be discussed here.

Microfinance advocacy networks and donors generally suggest that female loan clients represent a lower credit risk. The main question of this study is therefore as following:

Are female loan clients in D-MIRO less delayed on their loans than men?

I also investigate whether marital status, age or educational level explain default risk.

The basic model is:

$$Delayed\ pay = \beta_0 + \beta_{1\ female} + \beta_{2\ age} + \beta_{3\ educational\ level} + \beta_{4\ marital\ status} + e$$

Where *e* is the error term that is assumed to be normally distributed with mean 0 and standard deviation σ.

I then move on to investigate whether the other explanatory factors affect the default rate of men and women differently. This is done by first splitting the sample by gender but then also by interacting the female dummy variable with all the other independent variables. The interaction will allow me to see whether the differences in the effects are statistically significantly different across genders.

4.3 Repayment by gender

Table 2	Observations	Mean	Min	Max	Percent
Delayed male	3273	529.5	1	2284	17.96
Delayed female	4582	568.14	1	2303	17.20

I created dummy variables for delayed females and delayed males in my sample. Table 2 shows that in the sample there are 4582 women versus 3273 men defaulting on their loan. This means that 17.20 % of women in our sample are defaulting on their loan, versus 17.96 % of men (see table 1 for total number of male and female loan clients). Women who are delayed with payment are on average approximately 38 days more delayed than men.

Column 1 in Table 3 shows the correlation between gender and days delayed with repayment, when not controlling for any other variables. It seems to be no significant difference between women and men on the repayment rate. However, there may still be differences across the genders when we control for other variables that differ between them. When I add the variables I wish to control for in the regression, in column 2, there is still no significant difference between men and women on the repayment rate. Not surprisingly the groups with least education are more delayed with repayment. Belonging to the youngest age group is correlated with less delay on repayment. Being married or cohabiting is also correlated with less delay on repayment.

It may still be the case, however, that the effects of the control variables are different for men and women. For example, it may be the case that there is a difference between young women and young men, or between married women and married men. In order to test whether there are differences across the genders in the effects of these other variables I split the sample by gender and also run corresponding regressions with interaction terms. In particular, I will focus on the differential impact of age, marital status and educational level.

Table 3: Adding all control variables

	(1) Gender	(2) All control variables
female	2.620	-0.956
	(0.89)	(-0.32)
age_young		-67.69***
		(-4.14)
age_youngadult		13.97
		(1.94)
age_adult		11.36
		(1.66)
zero_ed		65.83*
		(2.38)
primary		78.51**
		(3.14)
basic		52.24*
		(2.08)
medium_level		40.73
		(1.63)
secondary		3.062
		(0.12)
married		-18.09***
		(-5.03)
divorced		19.58**
		(2.63)
cohabit		-16.97***
		(-4.47)
widower		-21.44*
		(-2.09)
_cons	95.11***	43.52
	(41.94)	(1.69)
N	44857	44857

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.4 Correlation between age and repayment

Table 4: Correlation between age and repayment

	(1) All	(2) Male	(3) Female
age_young	-77.11***	-90.68***	-67.60**
	(-4.75)	(-3.50)	(-3.24)
age_youngadult	5.219	-13.99	19.17*
	(0.74)	(-1.31)	(2.05)
age_adult	5.916	-1.243	11.44
	(0.87)	(-0.12)	(1.27)
_cons	92.04***	101.1***	85.27***
	(14.09)	(10.25)	(9.78)
N	44857	18221	26636

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4 shows the connection between default rate and age. The age of D-MIROs loan clients range from 17 to 79, and I've divided this interval into following groups:

"age_young": age < 21

"age_youngadult": age > 20 and age < 35

"age_adult": age >34 and age <61

"age_old" age > 60

I divided them into these groups to be able to see if there were any of the age groups that had a particular high degree of defaulting. I created interaction terms between the dummy variable *female* and the different age groups.

In the appendix in table 9 I present these results.

From this we can see that young men on average default by approximately 91 days less than the group “old”, those between 60-79 years. Young women pay back their loan on average by 23 days later than young men on average, but this difference is not statistically significant, as seen in appendix table 9. The total effect for young women is -91+ 23, so on average they default by 68 days less than the oldest.

Men in the group “young adult” default on average 14 days less than the group “old”, while women in the group “young adult” on average default by 33 days more than men in the same group. The difference between men and women in the group “young adult” as we can see from the table, is statistically significant at the 5 % significance level.

4.5 Correlation between education and repayment

Table 5: Correlation between education and repayment

	(1) All	(2) Male	(3) Female
zero_ed	64.15*	53.13	70.62
	(2.32)	(1.29)	(1.88)
primary	77.50**	77.83*	76.72*
	(3.10)	(2.13)	(2.24)
basic	51.10*	56.11	47.07
	(2.03)	(1.52)	(1.37)
medium_level	41.38	42.78	39.89
	(1.66)	(1.17)	(1.17)
secondary	6.234	13.00	1.550
	(0.24)	(0.34)	(0.04)
_cons	44.91	41.49	47.78
	(1.81)	(1.14)	(1.40)
N	44857	18221	26636

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In table 5 we see the differential impact of education for men and women. There are 6 different educational levels in the dataset: those with zero education, primary level, basic level, medium level, secondary level and higher level.

In the appendix in table 10 I present results where I created interaction terms between the dummy variable *female* and the different levels of education. From this it is showed that men with only primary level of education defaults by approximate 78 days more than men with higher education. This is significant at the 5 % level. The difference between men and women with this educational level is not statistically significant.

4.6 Correlation between marital status and repayment

Table 6: Correlation between marital status and repayment

	(1) All	(2) Male	(3) Female
married	-15.54***	-32.63***	-3.752
	(-4.43)	(-5.90)	(-0.80)
divorced	16.56*	8.218	20.33*
	(2.24)	(0.55)	(2.37)
cohabit	-11.28**	-20.18***	-7.427
	(-3.03)	(-3.53)	(-1.45)
widower	-18.35	-4.418	-19.79
	(-1.81)	(-0.19)	(-1.73)
_cons	103.6***	112.6***	99.57***
	(45.80)	(27.92)	(36.37)
N	44857	18221	26636

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

From table 6 we see that the relationship between being married and repayment for a male loan client means that he on average has approximately 33 days less delayed pay. This effect is significant at the 0.1 % level.

In the appendix in table 11 I present results where I created interaction terms between the dummy variable *female* and the different dummy variables representing marital status. There is a statistically significant difference between married men and women, which is significant at the 0.1 % level. Married women are on average 29 days more delayed with their repayment than married men. The total effect for married women is -33 + 29 = - 4 days. We also see directly in Table 6 that the correlation between being married and late pay is not statistically significant for women.

There is also a statistically significant effect from cohabiting; this effect is for some reason smaller. Men who cohabit pay back their loan on average 20 days sooner than single men (which is the group omitted here), and this

effect is significant at the 0.1 % level. The interaction term *fem_cohabit* shows that there is a difference between cohabiting men and women, but this effect is not statistically significant.

4.7 Combining all regressions

In table 7 I include all regressions first separately, and then in the 5th row all together. There are some changes in the results when I put all of them together.

The age group "*age_young"* is now significant 0.1 % level. A male loan client belonging to this group pays on average back their loan approximately 100 days before those belonging to the group *"old"*. The difference between genders in this age-group is not statistically significant.

A male loan client in the group *"young_adult"* pays on average back his loan 13 days sooner than a male in the group old. A female loan client pays on average back her loan 45 days later than men in the same age group. This difference is statistically significant at the 1 % level.

The correlation between being married and male means that married men on average has 42 days less delay on their loan-repayment. This is significant at 0.1 % level. There is a statistically significant difference between married men and married woman which also is significant at 0.1 % level. A married woman pays on average back her loan 37.5 days later than a married man.

A cohabiting male loan client is on average 30 days less delayed on his pay (significant at the 0.1 % level) while a cohabiting woman pays back her loan 17 days later than this, and this is significant at the 5 % level.

Table 7: Combining all regressions

	(1) Gender	(2) Age	(3) Education	(4) Marital status	(5) All
female	2.620				-45.42
	(0.89)				(-0.88)
age_young		-81.66**			-100.3***
		(-3.25)			(-3.78)
age_youngadult		-4.972			-13.13
		(-0.65)			(-1.20)
age_adult		7.771			3.100
		(1.09)			(0.30)
young_fem		7.294			50.53
		(0.24)			(1.50)
youngadult_fem		17.37**			45.16**
		(3.28)			(3.10)
adult_female		-3.099			15.26
		(-0.84)			(1.10)
zero_ed			49.72		46.86
			(1.58)		(1.13)
primary			74.42**		74.28*
			(2.95)		(2.01)
basic			52.70*		53.44
			(2.07)		(1.44)
medium_level			39.36		39.27
			(1.57)		(1.06)
secondary			9.589		7.145
			(0.35)		(0.19)
noedfem			23.78		32.82
			(0.95)		(0.59)
femprim			5.176		7.089
			(0.94)		(0.14)

femsecondary			-5.166 (-0.36)		-6.841 (-0.13)
married				-23.62***	-41.71***
				(-5.31)	(-7.22)
divorced				17.24	1.983
				(1.18)	(0.13)
cohabit				-11.16*	-29.86***
				(-2.39)	(-5.07)
widower				4.599	-19.79
				(0.20)	(-0.86)
fem_married				15.88**	37.53***
				(2.96)	(5.06)
fem_divorced				-0.890	24.77
				(-0.05)	(1.43)
fem_cohabit				-0.255	16.90*
				(-0.04)	(2.17)
fem_widow				-28.38	2.200
				(-1.13)	(0.09)
_cons	95.11***	92.04***	44.91	103.6***	71.95
	(41.94)	(14.09)	(1.81)	(45.81)	(1.88)
N	44857	44857	44857	44857	44857

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.8 Discussion of results

The claim that women are better credit risk is often put forward by microfinance promoters and donors. D'Espallier et al. (2009), among others, report findings that indicate a higher repayment rate when the MFI is targeting women. Nevertheless, other studies, like Bhatt and Thang (2002) and Anthony and Horne (2003), argue that there is no evidence that female loan clients are better payers of microcredit loans.

Analysis performed on data in this thesis show that there is no difference between men and women in general. However, through interaction terms that combine the effect of being female with other factors we do find some differences between repayment rates between men and women. This implies that different factors are of different importance for men and women.

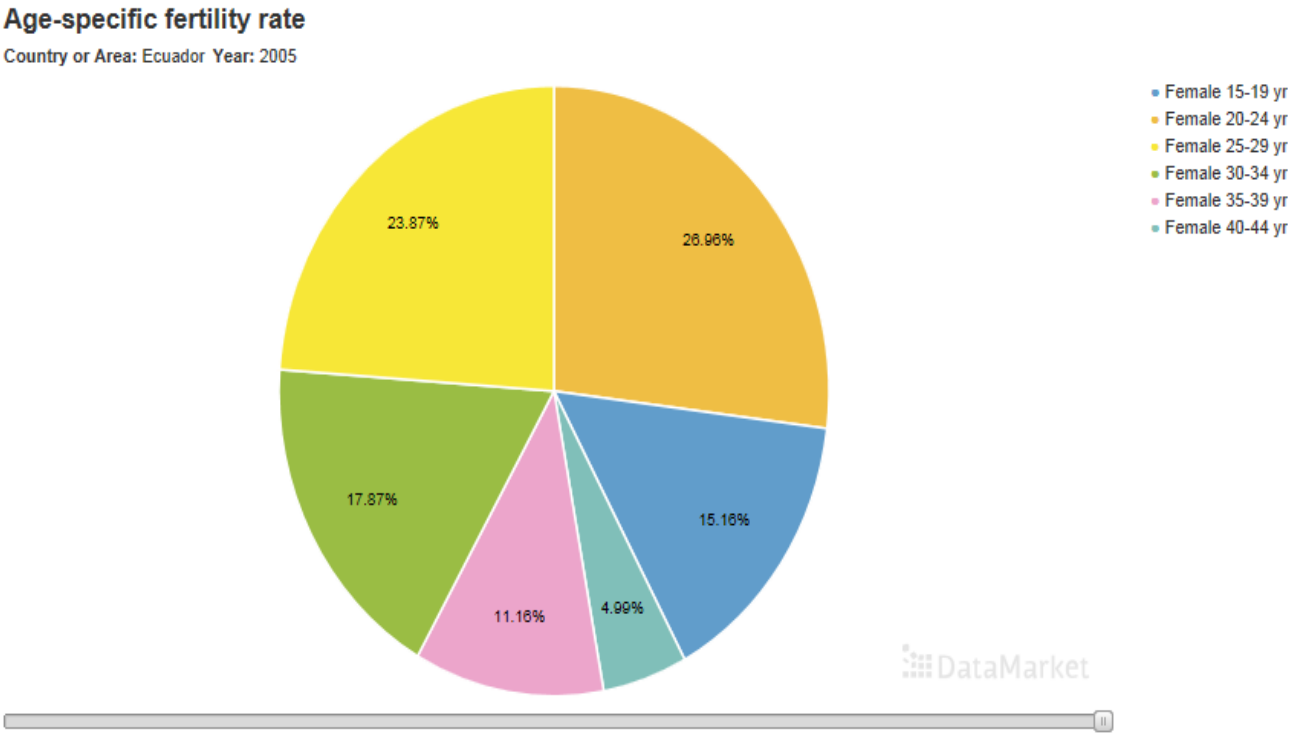
Bhatt and Thang (2002) and Olomola and Niser (2000) among others, found that higher levels of education leads to better repayment performance. This is in line with the findings here; loan clients with only primary level have a much higher default rate than those with higher levels of education. The difference between men and women with these levels of education is not statistically significant.

In addition, a significant effect of belonging to the youngest age group is found. On average members of this age group default by 100 days less than the oldest and this result is significant at 0.1 % level. Here the difference between men and women is not statistically significant.

An interesting finding is that men in the group "*young adult*" default on average 13 days less than the group "old". Women in this age group on the other hand, on average default by 45 days later than men. The difference between men and women in the group "*young adult*" as we can see from table 7, is statistically significant at the 1 % level.

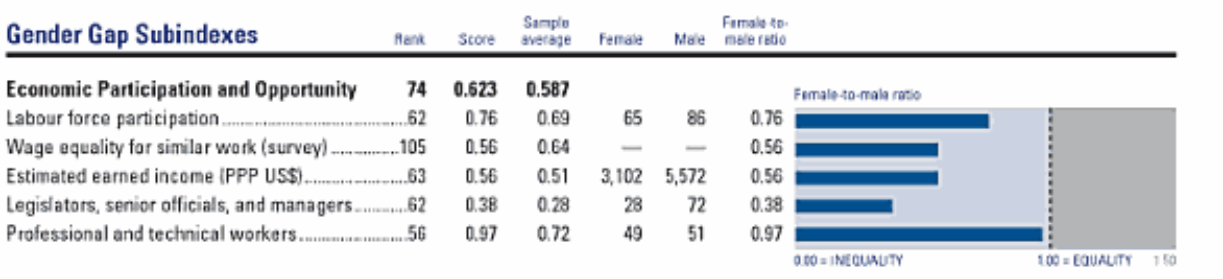
As numbers from United Nations Statistics Division in figure 1 shows, women in the age-group 20-35 gives birth to 68,7 % of births in Ecuador in 2005.

Figure 2



Our dataset does not contain information about the loan client's number of children. But it shows that women in the age-group where fertility is at its highest is more likely to default on their loan than men. An intuitive explanation of this would be that this is because women to a larger degree are caretakers of children. It does not necessarily mean that businesses led by women are more inefficient, or take higher risk, but that it can be explained by lack of gender equality within households.

Table 8



Gender Gap Subindexes	Rank	Score	Sample average	Female	Male	Female-to-male ratio
Economic Participation and Opportunity	**74**	**0.623**	**0.587**			
Labour force participation	62	0.76	0.69	65	86	0.76
Wage equality for similar work (survey)	105	0.56	0.64	—	—	0.56
Estimated earned income (PPP US$)	63	0.56	0.51	3,102	5,572	0.56
Legislators, senior officials, and managers	62	0.38	0.28	28	72	0.38
Professional and technical workers	56	0.97	0.72	49	51	0.97

Numbers for Ecuador from "*The global gender gap report"* (2008) show that there is inequality between men and women in Ecuador, for instance when it comes to wage for similar work. Table 8, taken from this report, shows that women earn on average 56 % of men's earnings for similar work.

Newman (2001) uses data from Ecuador to understand the impacts of women's employment on household paid and unpaid labor allocation in her report *" Gender, Time Use, and Change: Impacts of Agricultural Export Employment in Ecuador".* She compares two areas that are culturally similar, but differs in that the "treatment" area is in the area of the cut flower industry, which has a high demand for female labor, while the "control" is an economically more traditional valley. This study reveals large differences in time use by genders, which are independent of the effect of the flower sector. Men were working 3/4 of the time that women work, including housework, and correspondingly, women have much less leisure time than men. It is likely that these differences in household labor allocation may be an explanation for why women in the age-group "young adult" on average default by 45 days more than men in same age group.

In line with the findings of Agarwal et al. (2010) our data shows that the effect of being married affects the default rate. Among D-MIROs clients it is here found that the effect of being married for a male loan client means that he on average has approximately 42 days less delayed pay on average. This effect is significant at the 0.1 % level. There is a statistically significant difference between married men and women, which is significant at the

0.1 % level. Married women are on average 38 days more delayed with their repayment than married men.

There is also a significant effect from cohabiting; this effect is for some reason smaller. Men who cohabit pay back their loan on average 30 days sooner than single men (who is the group omitted here), and this effect is significant at the 0.1 % level. The interaction term *fem_cohabit* shows that cohabiting women are 17 days more delayed than cohabiting men, and this difference between men and women is significant at the 5 % level.

The fact that there are such significant differences between married men and married women is interesting. As mentioned earlier, it is likely to believe that women in Ecuador to a higher degree are caretakers of children. This could be one way of explaining why they repay their loans later.

5 Conclusion

A majority of MFIs in poor countries target women. There have been several suggestions claiming that women are better loan clients, since they take less risk and to a larger degree repay on time. However, there is little empirical evidence for this to be true, and there is no consensus among academics on the impact of microcredit.

The aim of this thesis was to investigate reasons for the high default rate in D-MIRO in Ecuador. My approach was to look for differences between genders, as this a highly relevant theme in the microfinance world.

Through the method of linear regression I utilized a set of control variables in the attempt to answer my research question: *Are female loan clients in D-MIRO less delayed on their loans than men?*

There seems to be no statistically significant difference between men and women on the repayment rate. Nonetheless, investigating the differential impact of other variables I find some differences between men and women. An interesting finding is that men in the group "*young adult*" default on average 13 days less than the group "old", while women in this age group on average default by 45 days more than men. The difference between men and women in the group "*young adult*" as we can see from the table, is statistically significant at the 1 % level. I argue that this may come from that women in this age group to a larger degree than men takes care of children, and that this may be their reason for later repayment. The same effect is shown when controlling for marital status, which I believe supports this suggestion. Men who are married or cohabiting on average pay their loan back sooner than women who are married and cohabit.

In other words, it is likely that these findings could come from that women to a larger degree take care of unpaid work within the home. This is in line with Newman's (2001) study on the paid and unpaid labor allocation of households in Ecuador, which showed that there were large differences

between men's and women's amount of work, and that women have less leisure time than men.

It is not unlikely that there is possible to find other differences between genders when comparing different characteristics. This seems to me to be necessary to be able to say with greater certainty which loan clients have the highest default rate. Suggestions for further research would for instance be to look at the different purposes for a microcredit loan, to see if there are differences between what types of businesses men and women want to start, and also to control for loan size. Geographical location could also be of interest, to see if there are any areas that stand out as problem-areas. This last effect could also be of interest if there are many of the same businesses located at the same place, thus leading to greater competition and making it harder to survive in the market.

There are many aspects that still need to be controlled for. However, based on my results it is not possible to say that there are large differences in the default rate of D-MIRO that is directly caused by gender.

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6 Appendix

6.1 Age

Table 9: Effect of age on repayment

	(1) All	(2) Male	(3) Female	(4) All, with interaction terms
age_young	-77.11***	-90.68***	-67.60**	-90.68***
	(-4.75)	(-3.50)	(-3.24)	(-3.46)
age_youngadult	5.219	-13.99	19.17*	-13.99
	(0.74)	(-1.31)	(2.05)	(-1.30)
age_adult	5.916	-1.243	11.44	-1.243
	(0.87)	(-0.12)	(1.27)	(-0.12)
female				-15.78
				(-1.20)
young_fem				23.08
				(0.69)
youngadult_fem				33.16*
				(2.33)
adult_female				12.69
				(0.93)
_cons	92.04***	101.1***	85.27***	101.1***
	(14.09)	(10.25)	(9.78)	(10.13)
N	44857	18221	26636	44857

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2 Effect of Education on repayment

Table 10: Effect of education on repayment

	(1) All	(2) Male	(3) Female	(4) All, with interaction terms
zero_ed	64.15*	53.13	70.62	53.13
	(2.32)	(1.29)	(1.88)	(1.28)
primary	77.50**	77.83*	76.72*	77.83*
	(3.10)	(2.13)	(2.24)	(2.10)
basic	51.10*	56.11	47.07	56.11
	(2.03)	(1.52)	(1.37)	(1.51)
medium_level	41.38	42.78	39.89	42.78
	(1.66)	(1.17)	(1.17)	(1.16)
secondary	6.234	13.00	1.550	13.00
	(0.24)	(0.34)	(0.04)	(0.34)
female				6.288
				(0.13)
noedfem				17.49
				(0.31)
femprim				-1.112
				(-0.02)
fembasic				-9.044
				(-0.18)
femmedium				-2.883
				(-0.06)
femsecondary				-11.45
				(-0.22)
_cons	44.91	41.49	47.78	41.49
	(1.81)	(1.14)	(1.40)	(1.13)
N	44857	18221	26636	44857

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.3 Effect of marital status on repayment

Table 11: Effect of marital status on repayment

	(1) All	(2) Male	(3) Female	(4) All, with interaction terms
married	-15.54***	-32.63***	-3.752	-32.63***
	(-4.43)	(-5.90)	(-0.80)	(-5.83)
divorced	16.56*	8.218	20.33*	8.218
	(2.24)	(0.55)	(2.37)	(0.55)
cohabit	-11.28**	-20.18***	-7.427	-20.18***
	(-3.03)	(-3.53)	(-1.45)	(-3.49)
widower	-18.35	-4.418	-19.79	-4.418
	(-1.81)	(-0.19)	(-1.73)	(-0.19)
female				-13.00**
				(-2.65)
fem_married				28.88***
				(3.97)
fem_divorced				12.11
				(0.70)
fem_cohabit				12.75
				(1.66)
fem_widow				-15.37
				(-0.60)
_cons	103.6***	112.6***	99.57***	112.6***
	(45.80)	(27.92)	(36.37)	(27.58)
N	44857	18221	26636	44857

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$